

SSME FMEA/CIL
REDUNDANCY SCREEN

Component Group: Combustion Devices
 CIL Item: A335-05
 Part Number: R048300
 Component: Large Throat Main Combustion Chamber
 FMEA Item: A335
 Failure Mode: Lee Jet fails to meter flow.

Prepared: A. El-Ahmed
 Approved: T. Nguyen
 Approval Date: 9/9/99
 Change #: 3
 Directive #: CCBD ME3-01-5238

Page: 1 of 1

Phase	Failure / Effect Description	Criticality Hazard Reference
4.1	<p>Loss of the purge allows icing over a long period of time causing an indicated Pc increase, resulting in channel disqualification. Disqualification of both channels results in electrical lockup. Loss of mission may result when electrical lockup occurs during Max Q throttling. Loss of mission could also occur as a result of an engine shutdown after Max Q if the Pc Diff Discriminator is lost</p> <p>Redundancy Screens: SENSOR SYSTEM: LIKE REDUNDANCY</p> <p>A: Pass - Redundant hardware items are capable of checkout during normal ground turnaround. B: Pass - Loss of a redundant hardware items is detectable during flight C: Pass - Loss of redundant hardware items could not result from a single credible event</p>	HR ME-GAM

SSME / AJGIL
DESIGN

Component Group: Combustion Devices
CIL Item: A335-05
Part Number: R046300
Component: Large Throat Main Combustion Chamber
FMEA Item: A335
Failure Mode: Lee Jet fails to meter flow.

Prepared: A. El-Ahmad
Approved: T. Nguyen
Approval Date: 9/9/99
Change #: 3
Directive #: CCBD ME3-01-523B

Page: 1 of 1

Design / Document Reference

FAILURE CAUSE: A: Lee Jet becomes plugged due to contamination.

THE PRESSURE SENSOR SYSTEM IS A REDUNDANT SYSTEM COMPRISED OF REDUNDANT SENSORS, REDUNDANT HARNESSSES, AND REDUNDANT CONTROLLER CHANNELS (1). TWO SEPARATE LEE JETS ARE LOCATED ON THE MCC 90 DEGREES APART. THE SCREEN IS CONE SHAPED, GIVING IT A LARGE SURFACE AREA (2). REDUCING THE POSSIBILITIES OF BLOCKAGE DUE TO CONTAMINATION. THE PRE START PURGE MINIMIZES THE POSSIBILITIES OF ICE FORMATION. A CLOGGED LEE JET IS INDICATED BY A DIFFERENCE IN THE TWO SENSORS. THE FUEL IS FILTERED TO 400-MICRONS AT THE EXTERNAL TANK (3). THE LEE JET ASSEMBLY IS PRESS-FIT INTO THE MCC FORWARD MANIFOLD (4) AND SECURED WITH AN EXPANDER PIN (5). THE LEE JET BODY AND EXPANDER PIN ARE FABRICATED FROM -303 CRES WHICH EXHIBITS GOOD CORROSION RESISTANCE AND STRENGTH IN A CRYOGENIC ENVIRONMENT. THE LEE JET ASSEMBLY IS SUBJECT TO A PROOF LOAD TEST TO VERIFY PROPER INSTALLATION (6). THE LEE JET CAVITY IS CONTAINED (ON THE PRESSURE TRANSDUCER SIDE) BY THE TRANSDUCER OFFSET MOUNT POST (7) WHICH, IN THE EVENT OF DISLODGING, IS DESIGNED TO RESTRICT PURGE ORIFICE (LEE JET) MOVEMENT

(1) CP406R0008 3 2 3 4; (2) RF251-4301-5821; (3) .CD 13M15000; (4) R0462RT; (5) RF251-4301-5801; (6) RSC07002; (7) R0010750-025

A - 172

**SSME FMEA/CIL
INSPECTION AND TEST**

Component Group: Combustion Devices
 CIL Item: A136-05
 Part Number: R046300
 Component: Large Throat Main Combustion Chamber
 FMEA Item: A135
 Failure Mode: Lee Jet fails to meter flow.

Prepared: A. El-Ahmad
 Approved: T. Nguyen
 Approval Date: 9/9/99
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Page: 1 of 1

Failure Causes	Significant Characteristics	Inspection(s) / Test(s)	Document Reference
A	LEE JET		RP251 4301 5801
	FUEL CLEANLINESS	LEE JET AND UPSTREAM COMPONENTS ARE CLEANED TO FUEL USAGE REQUIREMENTS. PC PARTS AND SENSE LINE PASSAGES ARE BORESCOPE INSPECTED FOR CONTAMINATION AFTER EACH FLIGHT.	RL10001
	ASSEMBLY INTEGRITY	THE HOT FIRE TESTING VERIFY SATISFACTORY OPERATION. PROPELLANT SYSTEM IS DRIED AND VERIFIED DRY AFTER EACH FLIGHT. SYSTEM PURGE PRIOR TO LAUNCH ASSURES PASSAGES ARE FREE OF MOISTURE. (LAST TEST)	RL00050 04 OMRSD V41CB0.0B2 OMRSD V41CB0.0B3 OMRSD 500FB0.300

Failure History: Comprehensive failure history data is maintained in the Problem Reporting database (PRAMS/PRACA)
 Reference: NASA letter SA21/BB/3DB and Rockwell letter 88RC09761.

Operational Use: FAILURE MODE CAN BE DETECTED IN REALTIME BY FLIGHT CONTROL TEAM WHO WILL EVALUATE EFFECTS UPON VEHICLE PERFORMANCE AND ABORT CAPABILITY. BASED ON THIS EVALUATION THE APPROPRIATE ABORT MODE OR SYSTEM CONFIGURATION WILL BE SELECTED. FAILURE DETECTION CUES AND ASSOCIATED SSME PERFORMANCE DATA HAVE BEEN COORDINATED BETWEEN THE ENGINEERING AND FLIGHT OPERATIONS ORGANIZATIONS WITH THE RESPONSES DOCUMENTED IN MISSION FLIGHT RULFS.

A-173

**SSME :A/CIL
WELD JOINTS**

Component Group: Combustion Devices
 CIL Item: A335
 Component: R046300
 Part Number: Large Throat Main Combustion Chamber
 A335

Prepared: A. El-Ahmad
 Approved: T. Nguyen
 Approval Date: 9/9/99
 Change #: 3
 Directive #: CCBD MES-01-5239
 Page: 1 of 1

Component	Basic Part Number	Weld Number	Weld Type	Class	Access	Critical Initial		Comments
						Root Side Not	Flaw Size Not Detectable	
						HCF	LCF	
MAIN COMBUSTION CHAMBER	R046300	5	EBW	Ia	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	6,7	EBW	Ib	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	58,59	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	10	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	11,12	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	13,14	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	15	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	RC46300	16	FBW	II	X	X	X	
MAIN COMBUSTION CHAMBER	R046300	18	EBW	I	X			
MAIN COMBUSTION CHAMBER	R046300	22,23	EBW	I, Ia	X			
MAIN COMBUSTION CHAMBER	R046300	39,40	EBW	I	X			
MAIN COMBUSTION CHAMBER	R046300	63	GTAW	II	X	X	X	
MAIN COMBUSTION CHAMBER	RC46300	69,70	GTAW	II	X	X	X	

A - 175